



First amendment to claims 1-20 of Serial No. 10/040,751 including cancellation of claim 19.

1. (Presently amended) A high performance, fast-response, multi-sensor pressure probe for measuring velocity and pressure measurements, said probe comprising
 - a [small] spherical non-solid probe tip,
 - a plurality of holes in said probe tip,
 - a plurality of pressure transducers embedded in said holes [near] adjacent the end of the tip,
 - a plurality of sensors embedded in said tip adjacent said transducers, so as to give [a quick] an instantaneous response and high performance due to elimination of lag time between the sensor reading and the transducer response due to the close proximity between the transducers and sensors.
2. (Presently amended) A probe as in claim 1 wherein there are five sensors and five transducers in said tip.
3. (Presently amended) A probe as in claim 1 wherein there are seven sensors and seven transducers in said tip.
4. (Presently amended) A probe as in claim 1 wherein said probe tip is spherical and there are holes all around the sphere with sensors therein so that said probe is omni-directional.

5. (Presently amended) A probe as in claim 1 wherein said sensors have a high frequency response and are located in holes [near] adjacent the tip of the probe so as to minimize hole channel length and thus the time lag induced by the volume from the probe surface to the sensor diaphragm as well as moving the Helmholtz resonance frequency well above the transducer frequency.
6. (Presently amended) A probe as in claim 1 wherein said tip is hemispherical and has five holes therein with five sensors mounted in said holes and having a frequency response of at least 20kHz.
7. (Presently amended) A probe as in claim 6 wherein the probe can operate at temperatures as high as 400 degrees Fahreheit.
8. (Presently amended) A probe as in claim 1 wherein the probe tip is 1.5mm in diameter.
9. (Presently amended) A probe as in claim 1 wherein the transducers are no more than 2 inches from the sensors.
10. (Presently amended) A flow control multi-sensor probe for flow control experiments, said probe comprising,

a probe body having a probe tip,
holes in said probe tip,
a number of sensors mounted in said holes in said tip,
a corresponding number of pressure transducers with a range of plus or minus
2 PSIG installed in the probe body,
said transducers being plus or minus 2 inches from said sensors.

11. (Presently amended) A probe as in claim 10 having a self-contained computer,
said computer adapted to gain voltage from the transducers and converts it to
velocity components.

12. (Presently amended) A MEMS probe unit for high-performance, fast-
response multi-sensor pressure probe of [miniature size] less than 1.5mm for
velocity and pressure measurements in unsteady and turbulent flowfields, said
probe comprising;

a MEMS sensor array with five pressure sensors,
said MEMS pressure sensors being micromachined and containing bossed
diaphragm structures for improved sensitivity,
said sensors being set in a cross pattern.

13. (As originally filed) An omni-directional three component flow velocity
measurement pressure probe with fast dynamic response, said probe comprising

a spherical tip,
a plurality of sensors mounted on said tip by flexible skin technology,
said sensors being equidistant from one another.

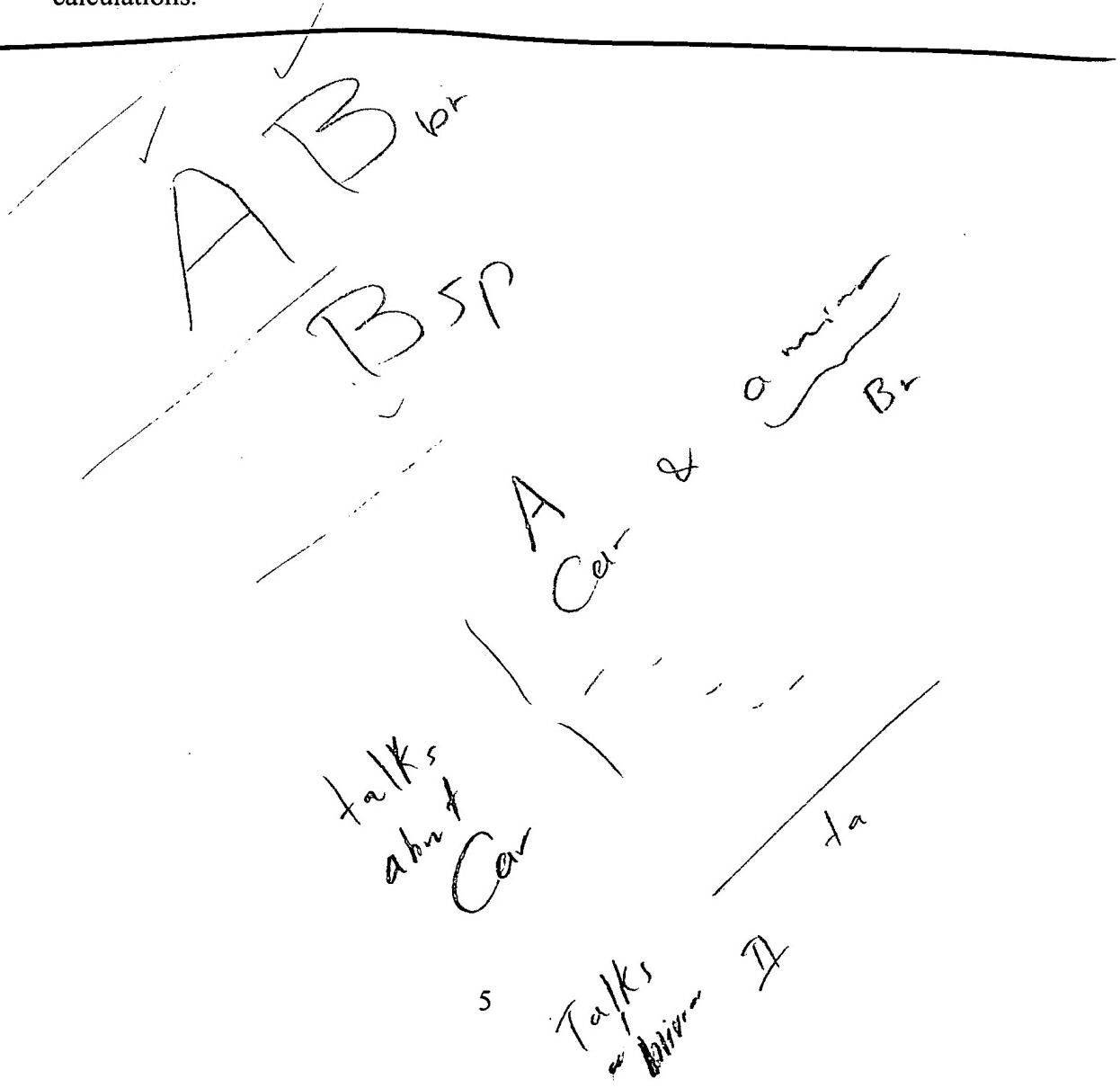
14. (As originally filed) A probe as in claim 13 wherein said sensors are fabricated on thin flexible strips on the surface of said spherical tip with electrical leads connected to transducers through the body of said tip.
15. (As originally filed) A multi-hole probe for measuring flow velocity, said probe comprising;
 - a probe tip,
 - holes in said probe tip,
 - a plurality of pressure sensors located in said tip in the immediate vicinity of said holes and in communication with said holes so that said sensors produce an almost instantaneous reading of the pressure in said holes from said flow.
16. (As originally filed)A multi-hole probe as in claim 15 wherein said tip is spherical.
17. (As originally filed) A multi-hole probe as in claim 15 wherein said holes constitute a MEMS sensor array and said sensors including bossed diaphragm structures for improved sensitivity.

18. (Presently amended) The process of calculating velocity magnitude, the flow angles and the static pressure of a given flow, said process comprising:

- a) calculating the geometric location for each port
- b) calculating the steady probe [calculation] flow.

19. (Presently cancelled) The process of claim 18 only calculating the unsteady probe calculation.

20. (Presently amended) The process of claim [19] 18 and including additional calculations.





Form 1449

U. S. Patents	Inventor(s)
5,423,209	Nakaya et al
3,699,811	Maiden
5,466,067	Hagan et al
5,406,839	Leblonde et al
5,396,524	Lyman
5,412,983	Rombach et al
5,117,687	Gerardi
4,833,917	Wilson
4,388,691	Nuspi



Telionus12

SUBSTITUTE DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As the below named inventors, we hereby declare that:

Our residences, post office addresses and citizenship are as stated below next to our names.

We believe that we are the original and first inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled EMBEDDED-SENSOR MULTI-HOLE PROBE, filed under that title on January 8, 2002, and which has the Serial No. 10/040,751. It claims priority of an invention entitled EMBEDDED SENSOR MULTI-HOLE PROBE filed as a Provisional Application on January 12, 2001 in the USA which has the Serial No. 60/260,955.

We hereby state that we have reviewed and understand the contents of the above identified specification including the claims.

We acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37. code of Federal Regulations, para. 1.56 (a) and are aware of the criminal penalties for willful false statements hereunder.

We hereby appoint James W. Hiney, Esq., a member of the bars of the District of Columbia and the Commonwealth of Virginia and the U. S. Patent Office, Reg. No. 24, 705, with offices at 1872 Pratt Drive, Suite 1100, Blacksburg, VA 24060 as our attorney to prosecute this application to issue with full power of substitution and revocation, to transact all business with the U. S. Patent and Trademark Office in connection herewith and to receive the Patent Grant.


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